

## TROPICAL CYCLONE 04B

Tropical Cyclone 04B was the last tropical cyclone of 1984 to develop in the North Indian Ocean. Like two of the three storms before it, Tropical Cyclone 04B distinguished itself by its unusual track.

Early on 20 November a large area of convection extended from the southern Bay of Bengal across the equator into the South Indian Ocean. There were two weak low-level circulations associated with this convection - one on either side of the equator. Although the convection showed no organization at this time, it was extensive in size; extending from 12N to 12S and from 70E to 100E. The most intense convection was near the equator where northwest low-level flow from the northern hemisphere converged with southwest flow from the southern hemisphere.

The tropical disturbance that was to become Tropical Cyclone 04B first appeared as an organized area of convection within the broad area near 6N 85.5E. The area was mentioned on the 200600Z Significant Tropical Weather Advisory (ABEH PGTW) and was given a "poor" potential for development into a significant tropical cyclone during the next 24 hours.

The broad disturbance persisted during the next five days and by 0600Z on the 25th, the two surface circulations on either side of the equator had moved further apart and were becoming more organized. Upper-level outflow over the area appeared weak but diffluent.

By 270600Z, the disturbance in the Bay of Bengal had reached tropical depression strength and had become more organized. This was indicated on satellite imagery by convective banding and the presence of anticyclonic upper-level outflow. This system was now judged to have "fair" potential for significant tropical cyclone development during the next 24 hours. During the next 12 hours the intensity and organization of the convection continued to increase prompting the issuance of a TCFA valid at 271900Z.

At 280600Z, the system had further intensified with Dvorak intensity analysis indicating that surface winds of 35 kt (18 m/s) were present. The disturbance now had a central core of intense convection. This prompted the first warning on Tropical Cyclone 04B to be issued at 280600Z.

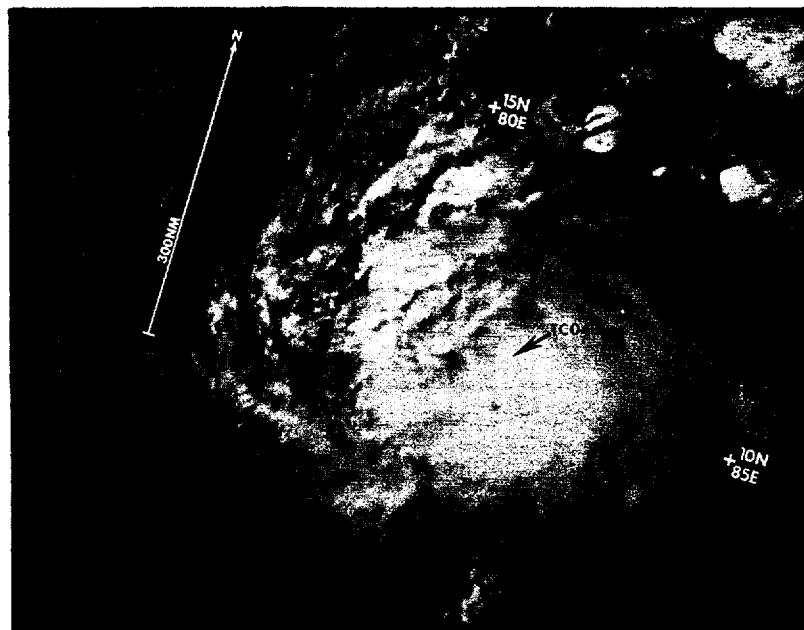


Figure 3-34-1. Tropical Cyclone 04B near maximum intensity (010509Z December DMSP visual imagery).

During the next 48 hours, Tropical Cyclone 04B moved in a slow anticyclonic loop while steadily intensifying. At 301200Z November, it had completed its loop and was estimated to have sustained surface winds of 65 kt (33 m/s). Once again this was based solely on the Dvorak intensity analysis of satellite imagery.

Tropical Cyclone 04B moved west during the next 18 hours, accelerated slightly and intensified to a peak intensity of 75 kt (39 m/s) (Figure 3-34-1). It then made a slight turn to the west-northwest and accelerated further to 16 kt (30 km/hr) as it made landfall on the east coast of India 40 nm (74 km) north of Nagappattinam (WMO 43340) at 011000Z December. After making landfall, the low-level circulation moved west across the southern tip of India and rapidly weakened. The mid-to-upper

level circulation, however, took a more northwestward track and became displaced from the low-level center by approximately 120 nm (222 km). Warning status was terminated on Tropical Cyclone 04B at 020000Z since the system had no convection associated with it and the low-level circulation was weak and poorly defined.

This weak but persistent low-level circulation now turned to the west-southwest, entered the Arabian Sea and slowly redeveloped (Figure 3-34-2). By the 3rd of December, the convection was redeveloping near the low-level center and reintensification appeared likely. This prompted the issuance of a second TCFA at 031200Z. The system continued to intensify and warning status was resumed at 031800Z December.

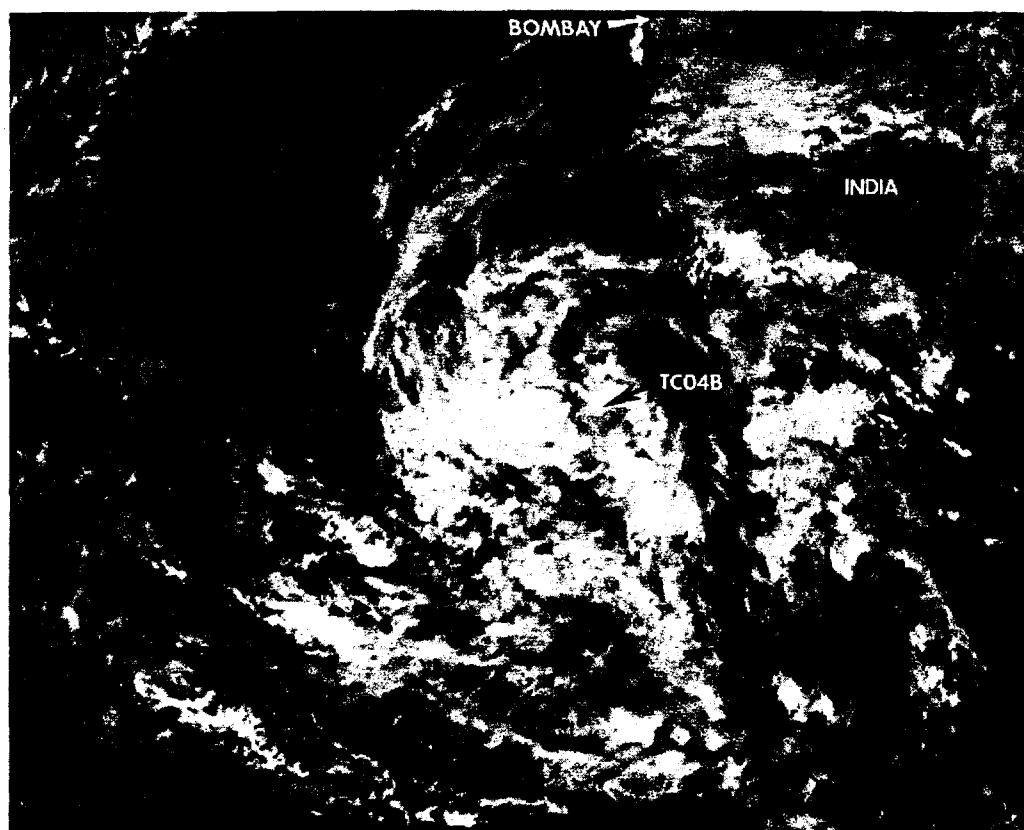


Figure 3-34-2. The poorly organized remnants of Tropical Cyclone 04B as it entered the Arabian Sea and began to reintensify (020448Z December DMSP visual imagery).

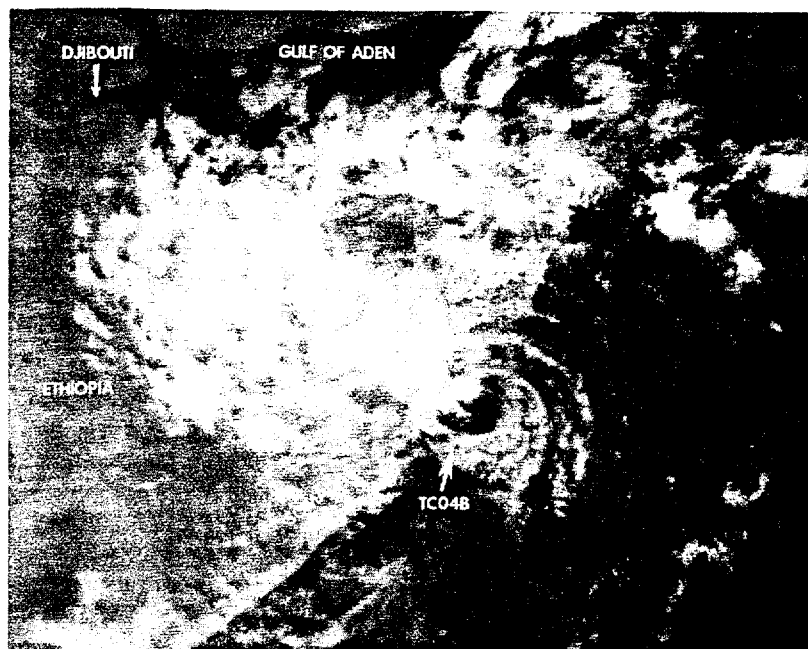


Figure 3-34-3. The exposed low-level circulation of Tropical Cyclone 04B located just off the east coast of Somalia (070630Z December DMSP visual imagery).

Tropical Cyclone 04B continued to move west-southwest, reaching an intensity of 60 kt (31 m/s) at 050600Z. For the next 42 hours it moved in a general westerly direction across the Arabian Sea around the southern periphery of a low to mid-level anticyclone located near the Persian Gulf. There was no significant change in intensity during this period.

At 070600Z, Tropical Cyclone 04B was within 25 nm (46 km) of the Somalia coast and had weakened to 35 kt (18 m/s) (Figure 3-34-3). At this point, the low-level circulation, became exposed, moved inland, and then moved southwestward along the coast for 24 hours before dissipating over land. The mid-to-upper level circulation and associated convection moved off to the northwest. The final warning was issued at 080000Z.

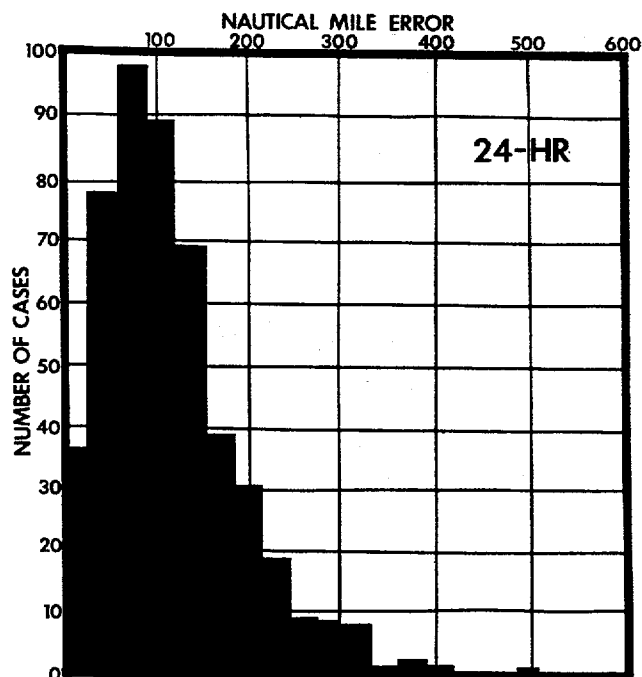


Figure 4-2

Frequency distribution of the 24-, 48-, and 72-hour forecast errors in 30 nm increments for all significant tropical cyclones in the western North Pacific during the 1984 season.

### FORECAST ERRORS (nm)

	<u>24-HR</u>	<u>48-HR</u>	<u>72-HR</u>
<b>MEAN:</b>	<b>117</b>	<b>233</b>	<b>363</b>
<b>MEDIAN:</b>	<b>101</b>	<b>211</b>	<b>316</b>
<b>STANDARD DEVIATION:</b>	<b>77</b>	<b>135</b>	<b>221</b>
<b>CASES:</b>	<b>492</b>	<b>378</b>	<b>286</b>

